

## CHROMOSOME NUMBERS IN THE MELASTOMATACEAE

M. L. Solt (+) and J. J. Wurdack  
U. S. National Herbarium, Smithsonian Institution

Chromosome numbers for the approximately 3500 species of New World Melastomataceae have scarcely been studied, with only the genus Rhexia having been thoroughly surveyed. The literature up to 1967 was summarized by Fedorov in "Chromosome numbers of flowering plants" (1969, page 430), a total of 56 taxa there listed (10 neotropical). Since then, additional counts have been reported for 1 species of Rhynchanthera, 1 of Tibouchina, 2 of Miconia, 1 of Mecranium, 7 of Monochaetum, 3 of Centradenia, and 13 taxa of Rhexia (references included in tribal discussions below). The current tabulation is approximately a 10-fold increase in reported chromosome numbers for New World species, but the total sample still covers only about 8% of the neotropical melastomes.

The cytologic work proceeded for 10 years (1967-1976), ending because of the illness of the senior author; laboratory and taxonomic facilities at the Smithsonian Institution were used. The cytologic and plant culture (except for pot-washing) aspects of the research were Solt's province, the taxonomy and systematic discussion her husband's. We have been grateful to the numerous collaborators who collected viable seeds throughout the neotropics (the names appearing with the vouchers) or furnished cultivated material. Also G. R. Proctor helped greatly during a trip to Jamaica in 1969 and numerous Venezuelan botanists in Caracas (Julian and Cora Steyermark, Getulio Agostini), Maracay (V. M. Badillo, George Bunting), and Mérida (M. López-Figueiras, H. Rodríguez, L. Ruiz-Terán, S. S. Tillett) were superb field companions in 1972.

Counts were mostly made from plants raised from seed in our Beltsville home or from flower buds collected in the field, occasionally from botanical garden greenhouse plants. Seed germination and growth was best in a mixture of 3 parts bottom-land loam, 3 parts peat, 1 part perlite, and 1 part sand; the mixture was overlain by shredded sphagnum, damping-off thus being inhibited. Since almost all the species sampled had quite small seeds, sowing was directly on the moist sphagnum.

Seedling germination was generally rapid (1-2 weeks) in capsular-fruited species, slower (1-2 months) in those with baccate fruits; the longest germination time after sowing was 4 months for Mouriri myrtillloides. Seedlings generally grew very slowly for several months, but thereafter more rapidly. They were transplanted into flats and later into pots, using the above-mentioned soil mixture; this mixture was rather acidic, only a very few melastomes being calciphiles. All seedlings were grown under fluorescent lights (16 hours per day) until about

20 cm tall, thereafter in daylight on a sunporch or (in the summer) in pots sunken in the ground out of doors. Some of the seedlings were grown to flowering; however in most cases this was impossible since the species are trees or large shrubs.

Root tips were used for mitotic counts, being treated for 3-5 hours in 8-hydroxyquinoline and fixed in Carnoy's solution (3:1 ethanol-glacial acetic acid). For staining, tips were treated for 5 minutes in a solution of 95% ethanol-concentrated HCl (1:1), rinsed with water, and squashed in aceto-carmine. For meiotic counts, anthers from young flower buds were fixed in modified Carnoy's solution (6:3:1 ethanol-chloroform-glacial acetic acid), transferred to 70% ethanol after 24 hours, and squashed in aceto-carmine. Numerous other techniques were tried, but with much less success than the above procedure. Camera lucida drawings were made under 1800X; a sampling of the drawings is here appended. Melastome chromosomes are mostly so small (0.5-1 micron) that even under the magnification used they appeared as mere dots without differential morphology.

For many of the species grown from seeds, a secondary herbarium voucher was made, a more direct reflection than usual of the actual identity of the chromosome source. All the secondary vouchers, as well as most of those which were seed sources, are deposited in the U. S. National Herbarium. A few primary vouchers are only in the herbaria of The New York Botanical Garden, Missouri Botanical Garden (Croat), University of Texas at Austin (Whiffin Central American collection numbers), or Harvard University (a few Schnell collections). Several of the chromosome numbers here reported were from preserved material sent by us to P. H. Raven prior to 1967 and are included at his request; these are so credited in the listings. The prefix W in the voucher numbers indicates Wurdack et al specimens; for specimens with multiple collectors, generally only the first botanist is listed. For localities, in the larger countries the state or equivalent political division is included while this detail is omitted in smaller ones; more exact localities can be obtained from the vouchers. A few Old World melastomes (Dissochaetiae, Sonerileae, Melastomeae) are included in the tabulations. As in the Flora of Ecuador, the generic order within the New World tribes follows an unpublished complete sequence.

#### MERIANIEAE

##### Meriania

grandidens Triana. n = 31. W2757, Mérida, Venezuela.  
hexamera Sprague. n = 23-25. Tillett 673-310, Amazonas, Peru.  
leucantha Sw. n = 15-17. W2612, Jamaica.  
macrophylla (Benth.) Triana subsp. costanensis Wurdack. n = ca. 30. W2689, Aragua, Venezuela.  
macrophylla (Benth.) Triana subsp. meridensis Wurdack. n = 31. W2756, Mérida, Venezuela.  
steyermarkii Gleason. n = 31. W2736, Mérida, Venezuela.  
urceolata Triana. n = 17. W2845, Bolívar, Venezuela.

## MERIANIEAE (continued)

Adelobotrys

adscendens (Sw.) Triana.  $2n = 30$ . Seedlings from Cuatrecasas 27456, Valle, Colombia.

Axinaea

grandifolia (Naud.) Triana.  $n = 30-31$ . W2715, Mérida, Venezuela.

cf. grandifolia (Naud.) Triana.  $n = 31$ . W2735, Mérida, Venezuela.

ruizteranii Wurdack.  $n = 31$ . W2787, Táchira, Venezuela.

Graffenrieda

conostegioides Triana.  $2n = 56^+2$ . W2647, from seeds of Cowan 2407, Caquetá, Colombia.

gracilis (Triana) L. Wms.  $2n = 26$ . Seedlings from W2811, Táchira, Venezuela.

obliqua Triana.  $n = 26$ . W2822, Bolívar, Venezuela.

Bucquetia

vernicolor Gleason.  $n = 18$ . W2802, Táchira, Venezuela.

Acanthella

sprucei Hook. f.  $2n = 20$ . W2570, seedlings from Dressler s. n., Amazonas, Venezuela.

## DISSOCHAETAEAE

Medinilla

astronoioides Triana.  $n = 21$ . W2860, from seeds of Price 178, Luzon, Philippines.

curtisii Hook. f.  $n = 21(20)$ . Brooklyn Botanic Garden (no voucher).

myriantha Merrill.  $n = 21$ ,  $2n = 42$ . Seedlings from Price 190, Luzon, Philippines.

ternifolia Triana.  $2n = \text{ca. } 36$ . Seedlings from Price 191, Luzon, Philippines.

## BERTOLONIEAE

Opisthocentra

clidemiooides Hook. f.  $2n = 24$ . Seedlings from Steyermark & Bunting 102897, Amazonas, Venezuela.

Macrocentrum

droseroides Triana.  $n = 12$ . W2819, Bolívar, Venezuela.

minus Gleason.  $n = 12$ . W2828, Bolívar, Venezuela.

Bertolonia

maculata DC.  $n = 14$ . W2659, from seeds furnished by Kew.

## BERTOLONIEAE (continued)

Bertolonia (continued)

marmorata (Naud.) Naud. var. aenea (Naud.) Cogn.  $n = 14$ .  
W2578, from plants of New York Botanical Garden 70819.

Monolena

sp.  $2n = 16$ ,  $n = 8$ . N. Williams s. n., Cerro Jefe, Panama.  
sp.  $n = 8$ . Dressler 4247, Panama.

Triolena

hirsuta (Benth.) Triana.  $n = 17$ . W2569, from seeds of Cowan  
2402, Costa Rica.

pustulata Triana.  $n = 17$ . W2645, from seeds furnished by Kew.

## SONERILEAE

Sonerila

margaritacea Lindl. cv. 'Argentea'.  $n = 17$ . W2642, from plants  
of New York Botanical Garden 1288/64.

Calvoa

orientalis Taub.  $2n = 34$ . W2853, from seeds furnished by  
Botanic Garden, University of Copenhagen.

orientalis Taub.  $n = 17$ . W2854, from seeds furnished by Jardin  
botanique national de Belgique (as C. sessiliflora).

Amphiblemma

cymosum (Schrad. & Wendl.) Naud.  $n = 38$ . W2661, from plants of  
New York Botanical Garden 502/63.

## MICROLICIEAE

Trembleya

parviflora (Don) Cogn. subsp. triflora (DC.) Cogn.  $2n = 22$ .  
Seedlings from Irwin 8149, Distrito Federal, Brazil.

Lavoisiera

bergii Cogn.  $2n = 26$  (Raven). Seedlings from Santos &  
Castellanos 24161, Minas Gerais, Brazil.

grandiflora Naud.  $2n = 24$ . Seedlings from Irwin 8593,  
Distrito Federal, Brazil.

sp. (aff. crassifolia DC.).  $2n = 24$ . Seedlings from Irwin  
20816, Minas Gerais, Brazil.

sp. (aff. pectinata Cogn.).  $2n = 26$ . Seedlings from Irwin  
20494, Minas Gerais, Brazil.

Microlicia

fasciculata Mart. ex Naud.  $2n = 46$ . W2575, from seeds of  
Lima 24, Distrito Federal, Brazil.

cf. graveolens DC.  $2n = \text{ca. } 34$ . Seedlings from Irwin 20723,  
Minas Gerais, Brazil.

## MICROLICIEAE (continued)

Rhynchanthera

grandiflora (Aubl.) DC.  $2n = 20$ . W2663, from seeds of Bunting  
s. n., Amazonas Venezuela.  
grandiflora (Aubl.) DC. var. microphylla Naud.  $2n = 22$ .  
W2865, from seeds of McDaniel 15460, Pará, Brazil.  
rostrata DC.  $n = (9)10$ . W2548, from seeds of Sucre 829,  
Distrito Federal, Brazil.  
serrulata (Rich.) DC.  $n = 9$ . Seedlings from Tamayo 4544,  
Guárico, Venezuela.

Siphanthera

cordifolia (Benth.) Gleason.  $n = 10$ . W2838, Bolívar,  
Venezuela.  
hostmannii Cogn.  $n = 18$ . W2835, Bolívar, Venezuela.

Centradenia

floribunda Planchon.  $n = 18$ . W2546, from plants of Longwood  
Gardens 631027, Mexico.  
inaequilateralis (S. & C.) G. Don.  $n = 18$ . W2565, from seeds  
of Cowan 2403, Costa Rica.

## TIBOUCHINEAE

Marcetia

taxifolia (St. Hil.) DC.  $2n = 24$  (Raven). W2637, from seeds  
of Santos 5254, Guanabara, Brazil.  
taxifolia (St. Hil.) DC. var. glandulosa (DC.) Cogn.  $2n = 24$ .  
W2605, from seeds of Irwin 20879, Minas Gerais, Brazil.

Macairea

pachyphylla Benth.  $n = 12$ . W2844, Bolívar, Venezuela.  
parvifolia Benth.  $n = 12$ . W2843, Bolívar, Venezuela.  
spruceana Triana.  $2n = 22$ . Seedlings from Bunting 4082,  
Amazonas, Venezuela.  
stylosa Triana.  $2n = 24$ . Seedlings from Steyermark 102968,  
Amazonas, Venezuela.

Comolia

microphylla Benth.  $n = 18(19)$ . W2840, Bolívar, Venezuela.

Ernestia

maguirei Wurdack.  $n = 11$ . W2751, Mérida, Venezuela.  
quadriseta Triana.  $2n = 22$ . Seedlings from McDaniel 14243,  
San Martín, Peru.

Nepsera

aquatica (Aubl.) Naud.  $n = 9\frac{1}{2}$ . W2554, from seeds of Duke  
s. n., Porto Rico.

## TIBOUCHINEAE (continued)

Acisanthera

quadra Pers. n = 22. W2564, from seeds of Schnell 418, Costa Rica.

Aciotis

aff. aristellata Markgraf. n = 30. W2851, from seeds of W2848, Bolívar, Venezuela.

laxa (Rich.) Cogn. n = 26. W2847, Bolívar, Venezuela.

leviana Cogn. 2n = 24. Seedlings from Schnell 519, Costa Rica.

polystachya (Bonpl.) Triana. n = 10. W2568, from seeds of Tillett 676-410, Peru.

polystachya (Bonpl.) Triana. n = 10. W2852, from seeds of Rimachi 395, Loreto, Peru.

purpurascens (Aubl.) Triana. n = ca. 40. W2634, from seeds of Cowan 2414, Caquetá, Colombia.

rostellata (Naud.) Triana. n = 30. Seedlings from Schnell 1006, Costa Rica.

Tibouchina Sect. Involucrales

mutabilis (Vell.) Cogn. 2n = 36. Longwood Gardens 581557 (Peterson 62).

organensis Cogn. 2n = 36. Meyer 8331, cultivated U. S. National Arboretum.

Tibouchina Sect. Pleroma

candolleana (DC.) Cogn. 2n = 36. Seedlings of Pires 11938, Distrito Federal, Brazil.

clavata (Pers.) Wurdack. 2n = 36. W2587, from seeds of L. B. Smith s. n., São Paulo, Brazil.

cryptadena Gleason. 2n = 54. Seedlings of W2725, Mérida, Venezuela.

granulosa (Desr.) Cogn. 2n = 36. Seedlings from Pires 10193, Distrito Federal, Brazil.

lindeniana Cogn. n = 18. W2732, Mérida, Venezuela.

multiflora (Gardn.) Cogn. 2n = 36. Seedlings from Steyermark 100211, cultivated in Miranda, Venezuela.

multiflora (Gardn.) Cogn. 2n = 36. Seedlings from Irwin 19802, Minas Gerais, Brazil.

urvilleana (DC.) Cogn. 2n = 56 (Raven). W2536, cultivated in Beltsville, Maryland.

Tibouchina Sect. Lepidotae

aristeguietae Wurdack. n = ca. 27. W2724, Mérida, Venezuela.

lepidota (Bonpl.) Baillon. 2n = ca. 122 (Raven). Seedlings from W1392, Amazonas, Peru.

Tibouchina Sect. Tibouchina

fraterna N. E. Brown. n = 9. W2834, Bolívar, Venezuela.

## TIBOUCHINEAE (continued)

Tibouchina Sect. Diotantha

chironioides (Griseb.) Cogn.  $2n = 36$ . Seedlings from Ernst 2169, Dominica.

ciliaris (Vent.) Cogn.  $2n = 36$ . W2639, from seeds of Cowan 2413, Caquetá, Colombia.

geitneriana (Schl.) Cogn.  $n = 18$ . W2671. Distrito Federal, Venezuela.

hintonii Gleason in ed.  $2n = 18$ . Seedlings from Whiffin & Rodriguez 437, Guerrero, Mexico.

kingii Wurdack.  $n = 27$ . W2580, from seeds of King 5999, Tolima, Colombia.

kingii Wurdack.  $n = 27$ . W2581, from seeds of King 6003, Tolima, Colombia.

laxa (Desr.) Cogn.  $2n = 36$ . Seedlings from Hutchison 6394, Cajamarca, Peru.

longifolia (Vahl) Baillon.  $n = 9$ . W2551, from seeds of Schnell 401, Costa Rica.

longifolia (Vahl) Baillon.  $n = 9$ . W2678, Distrito Federal, Venezuela.

mariae Wurdack.  $n = 18$ . W2571, from seed of W632, Amazonas, Peru.

mollis (Bonpl.) Cogn.  $2n = 36$ . Seedlings from King 5927, Cundinamarca, Colombia.

naudiniana (Dec.) Cogn. vel aff.  $n = 18$ . W2552, from seeds of Ernst 2533, Oaxaca, Mexico.

naudiniana (Dec.) Cogn. vel aff.  $n = 18$ . W2555, from seeds of Schnell 382, Costa Rica.

Tibouchina Sect. Pseudopterolepis

oerstedii (Triana) Cogn.  $2n = 66$ . Seedlings from Schnell 1027, Costa Rica.

sebastianopolitana (Raddi) Cogn.  $n = 9$ . W2544, from seeds of Santos 5004, Guanabara, Brazil.

simplicicaulis (Naud.) Cogn.  $2n = 18$ . Seedlings from Irwin 19599, Minas Gerais, Brazil.

versicolor (Lindl.) Cogn.  $2n = 18$ . Seedlings from L. B. Smith 15442, Santa Catarina, Brazil.

Tibouchina Sect. Purpurella

grossa (L.f.) Cogn.  $2n = 54 \pm 2$ . Seedlings from King 5904, Cundinamarca, Colombia.

Pterolepis

glomerata (Rottb.) Miquel.  $n = 18$ . W2635, from seeds of King 6368, Dominica.

pumila (Bonpl.) Cogn.  $n = 7$ . W2573, from seeds of Schnell 380, Costa Rica.

Heterocentron

elegans (Schl.) Kuntze.  $n = 18$ . W2636, plant from Longwood

## TIBOUCHINEAE (continued)

Heterocentron (continued)

Gardens.

glandulosum Schenk. n = 18. W2550, from seeds of Schnell 383, Costa Rica.macvaughii Whiffin var. vallartense Whiffin in ed. 2n = 36. W2666, from seeds of Whiffin & Rodriguez 455, Jalisco, Mexico.parviflorum Whiffin in ed. 2n = 36. W2665, from seeds of Whiffin & Rodriguez 436, Guerrero, Mexico.parviflorum Whiffin in ed. 2n = 36. W2667, from seeds of Whiffin & Rodriguez 439, Guerrero, Mexico.undulatum Naud. 2n = 36. W2668, from seeds of Whiffin & Rodriguez 453, Jalisco, Mexico.Brachyotumcogniauxii Wurdack. 2n = 20 (Raven). Seedlings from Hutchison 5513, Amazonas, Peru.multinervium Wurdack. 2n = 20 (Raven). Seedlings from Wurdack 1304, Amazonas, Peru.parvifolium Cogn. 2n = ca. 20. Seedlings from Hutchison 7268, Amazonas, Peru.quinquenerve (R. & P.) Triana var. pusillum Wurdack. 2n = 20. Seedlings from Tillett 673-337, Amazonas, Peru.radula Triana. 2n = 20 (Raven). Seedlings from Wurdack 1267, Amazonas, Peru.strigosum (L.f.) Triana. 2n = 20 (Raven). Seedlings from Wurdack s. n., Cundinamarca, Colombia.tyrianthinum Macbride. 2n = 20 (Raven). Seedlings from Ferreira 15120, Cajamarca, Peru.Chaetolepislindeniana (Naud.) Triana. n = 18. W2721, Mérida, Venezuela.lindeniana (Naud.) Triana. n = 18. W2769, Mérida, Venezuela.microphylla (Bonpl.) Miquel. n = 9. W2773, Mérida, Venezuela.Desmoscelisvillosa (Aubl.) Naud. 2n = 18 (Raven). Seedlings from Pires 9379, Distrito Federal, Brazil.Schwackaeacupheoides (Benth.) Cogn. n = 18. W2563, from seeds of Dwyer 668, Panama.Monochaetumbonplandii (Kunth) Naud. 2n = 36. Seedlings from W2711, Mérida, Venezuela.bonplandii (Kunth) Naud. X villosum Gleason subsp.venezuelense Wurdack. n = 18. W2722, Mérida, Venezuela.bonplandii (Kunth) Naud. var. 2n = 36. Seedlings from W2789, Tachira, Venezuela.

## TIBOUCHINEAE (continued)

Monocheatum (continued)

brachyurum Naud.  $2n = 36$ . Seedlings from W2740, Mérida, Venezuela.

floribundum (Schlecht.) Naud.  $2n = 36$ . Seedlings from Schnell 504, Costa Rica.

gleasonianum Wurdack.  $n = 18$ . W2768, Mérida, Venezuela.

humboldtianum (Kunth & Bouché) Kunth ex Walpers var. hirtum (Karst.) Wurdack.  $2n = 36$ . Seedlings from Steyermark & Wurdack 95859, Distrito Federal, Venezuela.

lineatum (Don) Naud.  $2n = 36$  (Raven). Seedlings from Ferreyra 15230, Amazonas, Peru.

lineatum (Don) Naud.  $n = 18$ . W2793, Táchira, Venezuela.

macrantherum Gleason.  $2n = 36$ . Seedlings from Schnell 259, Costa Rica.

mariae Wurdack.  $n = 18$ . W2792, Táchira, Venezuela.

myrtoideum (Bonpl.) Naud.  $n = 18$ . W2788, Táchira, Venezuela.

polyneuron Triana.  $n = ca. 18$ . W2723, Mérida, Venezuela.

rodriguezii Wurdack.  $n = 18$ . W2734, Mérida, Venezuela.

tachirense Wurdack.  $n = 18$ . W2790, Táchira, Venezuela.

venosum Gleason.  $n = 18$ . W2796, Táchira, Venezuela.

venosum Gleason X lineatum (Don) Naud.  $n = 18$ . W2798, Táchira, Venezuela.

## RHEXIEAE

Arthrostema

ciliatum R. & P.  $2n = 60$ ,  $n = 30$ . W2557, from seeds of Ernst 2588, Oaxaca, Mexico.

ciliatum R. & P.  $n = 30$ . W2760, Mérida, Venezuela.

## MELASTOMEAE

Osbeckia

octandra (L.) DC.  $2n = 20$ ,  $n = 10$ . W2664, from seeds of Read 2250, Ceylon.

stellata Ham. ex Ker-Gawl. var. crinita (Naud.) C. Hansen.  $n = 18$ . W2545, from seeds of United States National Arboretum PE 307301.

Melastoma

polyanthum Blume.  $2n = 24 \pm 2$ . W2861, from seeds of Price S. n., Luzon, Philippines.

Tristemma

mauritianum J. F. Gmel.  $n = 17$ . W2556, from plant of Longwood Gardens 66860.

Dissotis

rotundifolia Triana.  $n = 15$ . Longwood Gardens Acc. 5765 (Feele 1).

## MICONIEAE

Conostegia

arborea (Schlecht.) Steud.  $2n = 34$ . Seedlings from Rodman & Schnell 33, Mexico.

icosandra (Sw.) Urban.  $n = 17$ . W2693, Miranda, Venezuela.

montana (Sw.) DC.  $2n = 34$ . W2601, from seeds of Meussner 2, Martinique.

oerstediana Triana.  $2n = 34$ . Seedlings from Schnell 1020, Costa Rica.

subcrustulata (Beurl.) Triana.  $2n = 34$ ,  $n = 17$ . W2644, from seeds of Schnell 400, Costa Rica.

superba Naud.  $n = 17$ . W2630, Jamaica.

xalapensis (Bonpl.) Don ex DC.  $2n = 34$ . W2856, from seeds of McDaniel 14833, Panama.

xalapensis (Bonpl.) Don ex DC.  $2n = 34$ . W2858, from seeds of Whiffin & Rodriguez 393, Mexico.

xalapensis (Bonpl.) Don ex DC.  $n = 17$ . Grown from seed of Schnell 739, Costa Rica.

Miconia Sect. Tamonea

cf. caudata (Bonpl.) DC.  $2n = 34$ . Seedlings from Schnell 980, Costa Rica.

dodecandra (Desr.) Cogn.  $n = 68$ . W2609, Jamaica.

dodecandra (Desr.) Cogn.  $n = 68$ . W2701, Aragua, Venezuela.

mirabilis (Aubl.) L. Wms.  $2n = \text{ca. } 13^4$ . W2650, from seeds of Wasshausen 392, Dominica.

mirabilis (Aubl.) L. Wms.  $n = 68$ . W2697, Miranda, Venezuela.

paleacea Cogn.  $2n = 34$ . W2670, from seeds of Schnell 978, Costa Rica.

sanctiphilippi Naud.  $2n = 34$ . Seedlings from Wurdack s. n., Aragua, Venezuela.

serrulata (DC.) Naud.  $n = 46$ . W2626, Jamaica.

superba Ule.  $n = \text{ca. } 34$ . W2818, Bolívar, Venezuela.

Miconia Sect. Adenodesma

tomentosa (Rich.) Don ex DC.  $2n = 34$ . W2643, from seeds of Cowan 2405, Caquetá, Colombia.

Miconia Sect. Octomeris

araguensis Wurdack.  $n = 17$ . W2688, Aragua, Venezuela.

araguensis Wurdack.  $n = 17$ . W2708, Aragua, Venezuela.

avia Wurdack.  $n = 17$ . W2766, Mérida, Venezuela.

breteleri Wurdack.  $n = 17$ . W2765, Mérida, Venezuela.

canaguensis Wurdack.  $n = 17$ . W2744, Mérida, Venezuela.

funckii Wurdack.  $n = 17$ . W2693, Miranda, Venezuela.

macrodon (Naud.) Wurdack.  $n = 17$ . W2699, Aragua, Venezuela.

meridensis Triana.  $n = 17$ . W2718, Mérida, Venezuela.

salebrosa Wurdack.  $n = 17$ . W2745, Mérida, Venezuela.

tuberculata (Naud.) Triana.  $n = 17$ . W2673, Distrito Federal, Venezuela.

## MICONIEAE (continued)

Miconia Sect. Laceraria

lauriformis Naud.  $2n = 34$ . W2654, from seeds of Kalmbacher 56, UC Bot. Garden.

Miconia Sect. Miconia

aeruginosa Naud.  $n = 17$ . W2677, Distrito Federal, Venezuela.  
affinis DC.  $2n = 34$ . W2862, seedlings from Croat 15184, Panama.

albicans (Sw.) Triana.  $2n = 48$ . Seedlings from W2622, Jamaica.

albicans (Sw.) Triana.  $2n = 34$ . W2863, seedlings from McDaniel 14404, Belize.

appendiculata Triana.  $2n = 34$ . W2592, seedlings from Cowan 2417, Caquetá, Colombia.

astroplocama Donn. Smith.  $2n = \text{ca. } 48$ . W2604, seedlings from Schnell 671, Costa Rica.

bracteata (DC.) Triana.  $2n = \text{ca. } 48$ . Seedlings from W2824, Bolívar, Venezuela.

calvescens DC.  $2n = 34$ . W2576, seedlings from Whiffin 75, Amazonas, Colombia.

calvescens DC.  $2n = 34$ . W2866, seedlings from McDaniel 15251, Loreto, Peru.

cannabina Markgraf.  $2n = 32$ . Seedlings from McDaniel 13640, Loreto, Peru.

ceramicarpa (DC.) Cogn.  $2n = 34$ . W2657, seedlings from Holmquist s. n., Bolívar, Venezuela.

elata (Sw.) DC.  $2n = 44-48$ . Seedlings from Wurdack 2628, Jamaica.

eriocalyx Cogn.  $2n = 34$ . W2864, seedlings from McDaniel 14141, Loreto, Peru.

ibaguensis (Bonpl.) Triana.  $2n = 62$ . Seedlings from Rodman & Schnell 62, Costa Rica.

impetiolaris (Sw.) Don ex DC.  $n = \text{ca. } 27$ . W2625, Jamaica.

laevigata (L.) DC.  $2n = \text{ca. } 48$ . W2590, seedlings from Meussner s. n., St. Croix, Virgin Islands.

laevigata (L.) DC.  $n = \text{ca. } 24$ . W2620, Jamaica.

lateriflora Cogn.  $2n = 34$ . Seedlings from Schnell 984, Costa Rica.

macrothyrsa Benth.  $n = 17$ . W2681, Miranda, Venezuela.

nervosa (Smith) Triana.  $2n = 34$ . Seedlings from Croat 12872, Panama.

nervosa (Smith) Triana.  $2n = 34$ . Seedlings from King 6110, Putumayo, Colombia.

prasina (Sw.) DC.  $2n = 48-52$ . Seedlings from Cowan 2427, Para, Brazil.

rubiginosa (Bonpl.) DC.  $2n = 50$ . Seedlings from Rodman & Schnell 64, Costa Rica.

tillettii Wurdack.  $n = 17$ . W2833, Bolívar, Venezuela.

trinervia (Sw.) Don ex Loud.  $2n = 34$ . W2589, seedlings from Cowan 2415, Caquetá, Colombia.

## MICONIEAE (continued)

Miconia Sect. Miconia (continued)

virescens (Vahl) Triana.  $2n = 46 \pm 2$ . W2603, seedlings from King 6293, Dominica.

Miconia Sect. Glossocentrum

minutiflora (Bonpl.) DC.  $2n = 34$ . W2579, seedlings from Pires 6, Pará, Brazil.

Miconia Sect. Amblyarrhena

ciliata (Rich.) DC.  $n = 17$ . W2705, Aragua, Venezuela.

lacera (Bonpl.) Naud.  $n = 17$ . W2692, Miranda, Venezuela.

lucida Naud.  $n = 17$ . W2717, Mérida, Venezuela.

mulleola Wurdack.  $n = 17$ . W2795, Táchira, Venezuela.

nitidissima Cogn.  $n = 17$ . W2739, Mérida, Venezuela.

oinchrophylla Donn. Smith.  $2n = 34$ . W2568, seedlings from Schnell 474, Costa Rica.

pisinna Wurdack.  $n = 17$ . W2794, Táchira, Venezuela.

racemosa (Aubl.) DC.  $2n = 34$ ,  $n = 17$ . W2572, from seeds of Ernst 2082, Dominica.

spinulosa Naud.  $n = ca. 46$ . W2690, Aragua, Venezuela.

cf. spinulosa Naud.  $n = 17$ . W2712, Mérida, Venezuela.

ulmariooides Naud.  $n = ca. 34$ . W2746, Mérida, Venezuela.

Miconia Sect. Cremanium

bernardii Wurdack.  $n = 17$ . W2762, Mérida, Venezuela.

dolichopoda Naud.  $n = 17$ . W2774, Mérida, Venezuela.

elaeoides Naud.  $n = 17$ . W2785, Mérida, Venezuela.

jahnii Pittier.  $n = 17$ . W2772, Mérida, Venezuela.

mesmeana Gleason subsp. jabonensis Wurdack.  $n = 17$ . W2771, Mérida, Venezuela.

squamulosa (Smith) Triana.  $n = ca. 38$ . W2801, Táchira, Venezuela.

tamana Wurdack.  $n = 17$ . W2803, Táchira, Venezuela.

theaezans (Bonpl.) Cogn.  $n = 17$ . W2719, Mérida, Venezuela.

theaezans (Bonpl.) Cogn. subsp. flavescens Cogn. var.

lanceolata Cogn.  $n = 17$ . W2676, Distrito Federal, Venezuela.

theaezans (Bonpl.) Cogn. subsp. theaezans var. subtriplinervia Cogn.  $n = 17$ . W2755, Mérida, Venezuela.

theaezans (Bonpl.) Cogn. var.  $2n = 34$ . Seedlings from Cowan 2424, Costa Rica.

tinifolia Naud.  $n = 17$ . W2780, Mérida, Venezuela.

tinifolia Naud. var.  $n = 17$ . W2770, Mérida, Venezuela.

tovarensis Cogn.  $n = 17$ . W2716, Mérida, Venezuela.

tovarensis Cogn.  $n = 17$ . W2764, Mérida, Venezuela.

Miconia Sect. Chaenopleura

azuensis Urban & Ekman.  $2n = 34$ . W2591, from seeds of Alain 11575, Dominican Republic.

sintenisii Cogn.  $2n = 34$ . W2669, from seeds of Terborgh 449, Porto Rico.

## MICONIEAE (continued)

Heterotrichum

umbellatum (Mill.) Urban.  $2n = 30$ . W2577, from seeds of Alain 11315, Dominican Republic.

umbellatum (Mill.) Urban.  $n = 15$ . W2611, Jamaica.

Tetrazygia

bicolor (Mill.) Cogn.  $n = 17$ . Solt 1, Florida, U. S. A.

crotonifolia (Desr.) DC.  $2n = 34$ . W2600, from seeds of Alain s. n., Dominican Republic.

crotonifolia (Desr.) DC.  $2n = 34$ . Seedlings of Terborgh 18, Dominican Republic.

discolor (L.) DC.  $2n = 28$ . W2599, from seeds of King 6365, Dominica.

pallens (Spreng.) Cogn.  $2n = 34$ . W2652, from seeds of W2616, Jamaica.

Charianthus

corymbosus (Rich.) Cogn. var. longifolius (Cogn.) Hodge.  $n = 17$ . W2660, from seeds of King 6387, Dominica.

Tococa

cf. coronata Benth.  $2n = 56$ . Seedlings from Steyermark & Bunting 102961, Amazonas, Venezuela.

guianensis Aublet.  $2n = 34$ ,  $n = 17$ . W2566, from seeds of Schnell 487, Costa Rica.

guianensis Aublet.  $2n = 34$ . Seedlings from McDaniel 13680, Loreto, Peru.

guianensis Aublet.  $2n = 34$ . W2867, from seeds of McDaniel 14317, Belize.

nitens (Benth.) Triana.  $n = 17$ . W2839, Bolívar, Venezuela.

perclara Wurdack.  $2n = 34$ . Seedlings from Wurdack s. n., Miranda, Venezuela.

Clidemia Sect. Clidemia

bullosa DC.  $2n = 30$ . Seedlings from Cowan 2429, Pará, Brazil.

bullosa DC.  $2n = 30$ . W2597, from seeds of Whiffin TPW-30, Amazonas, Colombia.

capitellata (Bonpl.) D. Don.  $n = 17$ . W2558, from seeds of King 6160, Putumayo, Colombia.

dentata D. Don var.  $2n = 34$ . W2595, from seeds of Pires 4, Para, Brazil.

erythropogon DC.  $2n = 30$ ,  $n = 15$ . W2615, Jamaica.

heptamera Wurdack.  $n = ca. 23$ . W2827, Bolívar, Venezuela.

involucrata DC.  $n = ca. 23$ . W2825, Bolívar, Venezuela.

japurensis DC. var. heterobasis (DC.) Wurdack.  $2n = 30$ . W2596, from seeds of Schnell 570, Costa Rica.

octona (Bonpl.) L. Wms.  $2n = 34$ ,  $n = 17$ . W2646, from seeds of Schnell 402, Costa Rica.

octona (Bonpl.) L. Wms.  $2n = 34$ . Seedlings from Cowan 2408, Caquetá, Colombia.

## MICONIEAE (continued)

Clidemia Sect. Clidemia (continued)

octona (Bonpl.) L. Wms.  $2n = 34$ . W2857, from seeds of McDaniel 15205, Loreto, Peru.

octona (Bonpl.) L. Wms.  $n = 17$ . W2702, Aragua, Venezuela.

petiolaris (S. & C.) Schlecht. ex Triana.  $n = 17$ . W2559, from seeds of Schnell 599, Costa Rica.

pustulata DC.  $n = 17$ . W2849, Bolívar, Venezuela.

ruddae Wurdack.  $n = 23$ . W2638, from seeds of Rudd 3019, Nayarit, Mexico.

stellipilis (Gleason) Wurdack.  $n = \text{ca. } 17$ . W2832, Bolívar, Venezuela.

strigilllosa (Sw.) DC.  $n = 25(26)$ . W2618, Jamaica.

strigilllosa (Sw.) DC.  $2n = \text{ca. } 54$ . Seedlings from W2842, Bolívar, Venezuela.

urceolata DC.  $2n = 34$ . W2594, from seeds of Irwin 20685, Minas Gerais, Brazil.

urceolata DC.  $n = \text{ca. } 25$ . W2683, Miranda, Venezuela.

Clidemia Sect. Sagraea

ciliata Don var. elata (Pittier) Uribe.  $n = 24-26$ . W2731, Mérida, Venezuela.

cursoris Wurdack.  $n = 17$ . W2814, Táchira, Venezuela.

epiphytica (Triana) Cogn.  $2n = 30$ . Seedlings from Schnell 525, Costa Rica.

grandifolia Cogn.  $n = 17$ . W2698, Aragua, Venezuela.

insularis Domin.  $n = 17$ . W2623, Jamaica.

monantha L. Wms.  $n = 17$ . W2696, Miranda, Venezuela.

pilosa Don.  $n = 23(22)$ . W2583, from seeds of Hutchison 3952, Amazonas, Peru.

pilosa Don.  $n = 23$ . W2729, Barinas, Venezuela.

plumosa (Desr.) DC.  $n = 17$ . W2680, Distrito Federal, Venezuela.

sericea Don.  $n = 17$ . W2574, from seeds of Meyer 9923, Honduras.

tillettii Wurdack.  $n = 17$ . W2728, Barinas, Venezuela.

ulei Pilger.  $2n = 34$ . W2593, from seeds of Whiffin TPW-79, Amazonas, Colombia.

verticillata (Vahl) DC.  $n = 17$ . W2560, from seeds of Ernst s. n., Dominica.

Maieta

guianensis Aublet.  $2n = 34$ . Seedlings from L. B. Smith s. n., Para, Brazil.

poeppigii Mart. ex Triana.  $2n = 46$ . Seedlings from Whiffin 56, Amazonas, Brazil.

Myriaspora

egensis DC.  $2n = 30$ . W2633, from seeds of Pires 3, Para, Brazil.

## MICONIEAE (continued)

Belluciaaxinanthera Triana.  $n = 20(21)$ . W2813, Tachira, Venezuela.Henriettearamiflora (Sw.) DC.  $n = 28$ . W2627, Jamaica.Henriettellafascicularis (Sw.) Triana.  $2n = 56$ . W2868, from seeds of Croat 15080, Panama.Leandracaquetensis Gleason.  $2n = 34$ . W2653, from seeds of Cowan 2409, Caqueta, Colombia.dichotoma (Don) Cogn.  $2n = 34$ . W2859, from seeds of Croat 13197, Panama.granatensis Gleason.  $2n = 30$ . Seedlings from Schnell 574, Costa Rica.longicoma Cogn.  $n = 17$ . W2584, from seeds of Schnell 535, Costa Rica.mexicana (Naud.) Cogn.  $2n = 34$ . Seedlings from Schnell 992, Costa Rica.rufescens (DC.) Cogn.  $2n = 30(28)$ . W2598, from seeds of Pires 2, Pará, Brazil.sanguinea Gleason subsp. tepuiensis Wurdack.  $n = 17$ . W2816, Bolívar, Venezuela.secunda (Don) Cogn.  $2n = 34$ . W2648, from seeds of Whiffin 64, Amazonas, Colombia.solenifera Cogn.  $n = 17$ . W2602, from seeds of King 6219, Putumayo, Colombia.subseriata (Naud.) Cogn.  $2n = 34$ . Seedlings from King 6009, Tolima, Colombia.subseriata (Naud.) Cogn.  $n = 17$ . W2720, Mérida, Venezuela.xanthostachya Cogn.  $2n = 34$ . W2869, from seeds of Anderson 36036, Minas Gerais, Brazil.sp. (aff. oblongifolia Cogn.?).  $2n = 48$ . Seedlings from Anderson 35383, Minas Gerais, Brazil.Ossaeahirsuta (Sw.) Triana.  $n = 17$ . W2614, Jamaica.quinquenervia (Mill.) Cogn.  $2n = 34$ . W2662, from seeds of Schnell 1015, Costa Rica.

## BLAKEEAE

Blakeaschlimii (Naud.) Triana.  $n = \text{ca. } 90$ . W2713, Mérida, Venezuela.trinervia L.  $n = 31$ . W2610, Jamaica.tuberculata Donn. Smith.  $2n = \text{ca. } 62$ . W2649, from seeds of Cowan 2425, Costa Rica.

## BLAKEEAE (continued)

Topoebea

superba Naud.  $2n = 56$ . W2651, from seeds of Cuatrecasas 27577, Valle, Colombia.

## MEMECYLEAE

Mouriri

myrtilloides (Sw.) Poiret.  $2n = 14$ . Seedlings from W2624, Jamaica.

All available species of Merianieae were recalcitrant, both in cultural requirements and cytologic study. Whiffin & Tomb (Amer. Journ. Bot. 59: 411-422. 1972) reported merianoid seeds in Bucquetia; however, the chromosome number is not in line with those of the other genera in the very limited sampling. Acanthella is an aberrant genus; seedlings have swollen bases and usually died after reaching 12-15 cm in height.

Previous  $2n$  reports in the Dissochaetaceae were 64-68 (Dicellandra) and ca. 40 (Sakersia). Medinilla, currently with almost 500 binomials listed, now has almost 1% of the species counted.

Whiffin & Tomb found the seeds of Opisthocentra to be bertolonoid; other morphologic features as well as the chromosome number indicate that placement (rather than in the Merianieae) to be preferable. The seedlings of Opisthocentra clidemoides have leaves with regular lines of white spots as in some species of Bertolonia. The known base numbers in the Bertoloniaceae (8, 12, 14, 17) certainly do not refute my still-held thought that the neotropical tribe should be merged with the Sonerileae (8, 17, 19). The genus Monolena is being studied at the University of Minnesota, binomials for the chromosome vouchers to be supplied later.

In the Microlicieae, the sampling is too skimpy for any taxonomic extrapolations. The endemic genera of the Brazilian Planalto have been culturally refractory, perhaps because of mycorrhizal necessities (being investigated for Lavoisiera by Lourdes Queiroz Cobra in Brasilia). Davidse (Taxon 19: 103. 1970) reported  $2n = 20$  for Rhynchanthera paludicola (Donn. Smith) Gleason and Almeda (Journ. Arn. Arb. 58: 80. 1977) published counts (all  $n = 18$ ) for four taxa of Centradenia; Heitz' earlier-reported count for Centradenia floribunda was surely erroneous. Irwin 20723 is at least varietally distinct from Microlicia graveolens. Both species of Lavoisiera with  $2n = 26$  belong to Sect. Cataphractae DC., while those with  $2n = 24$  are in Sect. Gentianoidae DC.

Certainly the base number for Tibouchina and intimately related genera (Pterolepis, Heterocentron, Desmoscelis, Schwackaea) is 9. The species of Tibouchina counted include representatives from 7 of the 11 sections recognized by Cogniaux; of these sections, Pleroma and Involucrales are scarcely distinct

from each other, nor is Diotanthera well-marked from Pseudopterolepis. Purpurella probably represents evolutionary ends from various lines. The report for T. semidecandra by Favarger undoubtedly refers to the cultivated clone of T. urvilleana (Baileya 15: 1-6. 1967), which is self-sterile. The chromosome numbers substantiate the differentiation of T. organensis (T. "semidecandra var. floribunda") from T. urvilleana. The species complex around T. longifolia needs monographic study; the material here reported as T. naudiniana is vegetatively more like T. schiedeana (S. & C.) Cogn., but the stamens are like those in T. naudiniana; vegetatively the species also resembles T. longifolia, but has larger pink (rather than white) petals. Gadella (Act. Bot. Neerl. 18: 76. 1969) reported  $2n = 36$  for T. sellowiana (Cham.) Cogn. (Sect. Involucrales). Pterolepis pumila is vegetatively perhaps the smallest of all the Tibouchineae reported, but has the largest chromosomes and lowest number.

Brachyotum, Chaetolepis, and Monochaetum all have tibouchinoid seeds and the latter two genera also have base numbers of 9. Both sections of Monochaetum are represented among the species with chromosomes counted; the genus has a rather small morphologic amplitude and hybrids in populations of sympatric species are not infrequent. Almeda reported on 7 Central American species of Monochaetum (Univ. Calif. Publ. Bot. 75: 18-19. 1978), all with  $n = 18$ .

The other genera of Tibouchineae here reported all have microlicioid seeds and only Comolia and Nepsera (?) have a base number of 9. The diverse counts in Aciotis are rather surprising since the genus is morphologically close-knit and the species difficult to distinguish. The other four genera (Marcketia, Macairea, Ernestia, Acisanthera) have base numbers of 11 or 12. Arthrostema has traditionally been placed in the Tibouchineae, but seems better accommodated in the Rhexieae. Bostick (Sida 3: 395. 1969) reported a base number of 11 for thirteen taxa of Rhexia, with polyploid series (up to  $n = 33$ ) in four species and two polyploids ( $n = 22$ ) without diploid populations.

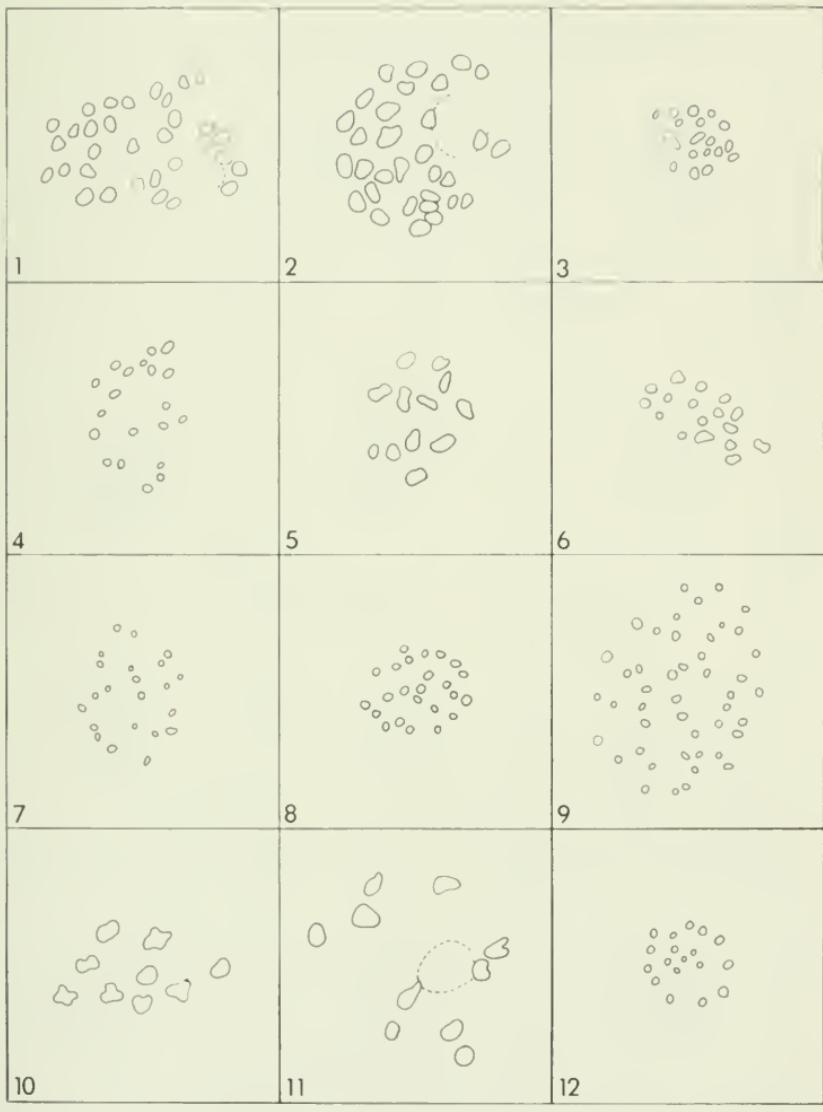
The commonest base number in the Miconieae is 17, a minority of taxa however with 23 or 24. The species thus far sampled in Miconia represent 6-7% of the described taxa and 9 of the 11 sections recognized by Cogniaux; the highest chromosome numbers are in some species of the (generally) morphologically primitive Section Tamonea. Nevling (Journ. Arn. Arb. 50: 102. 1969) reported  $n = 17$  for Miconia foveolata Cogn. and  $2n = \text{ca. } 34$  for M. pachyphylla Cogn., as well as  $n = 12$  for Mecranium amygdalinum (Desr.) C. Wr. ex Sauv. Four of Cogniaux' seven sections, Niangae (DC.) Cogn. (L. xanthostachya), Carassanae (Triana) Cogn. (L. subseriata, L. aff. oblongifolia), Tschudya (DC.) Cogn. (L. rufescens) and Secundiflorae (DC.) Cogn. (all other species reported) are represented in the chromosome sampling; the latter two sections are well-marked within the genus, but the Carassanae are poorly distinguishable among Cogniaux' sections III-V. The 6% sampling within Leandra is quite inadequate for any

infrageneric inferences.

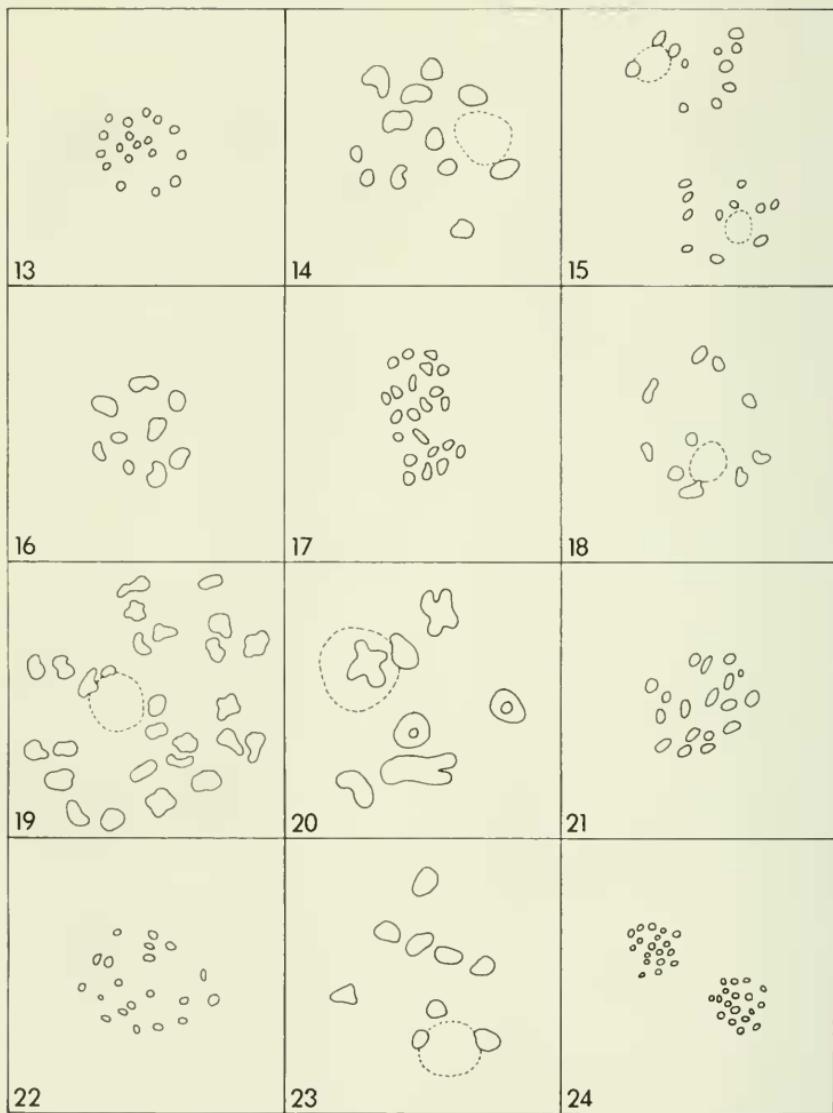
For both the Blakeae and Memecyleae, much more sampling is needed before any chromosome number data would be significant. Previously reported counts in Memecylon gave base numbers of 7 and 12.

Legend for Camera Lucida Drawings

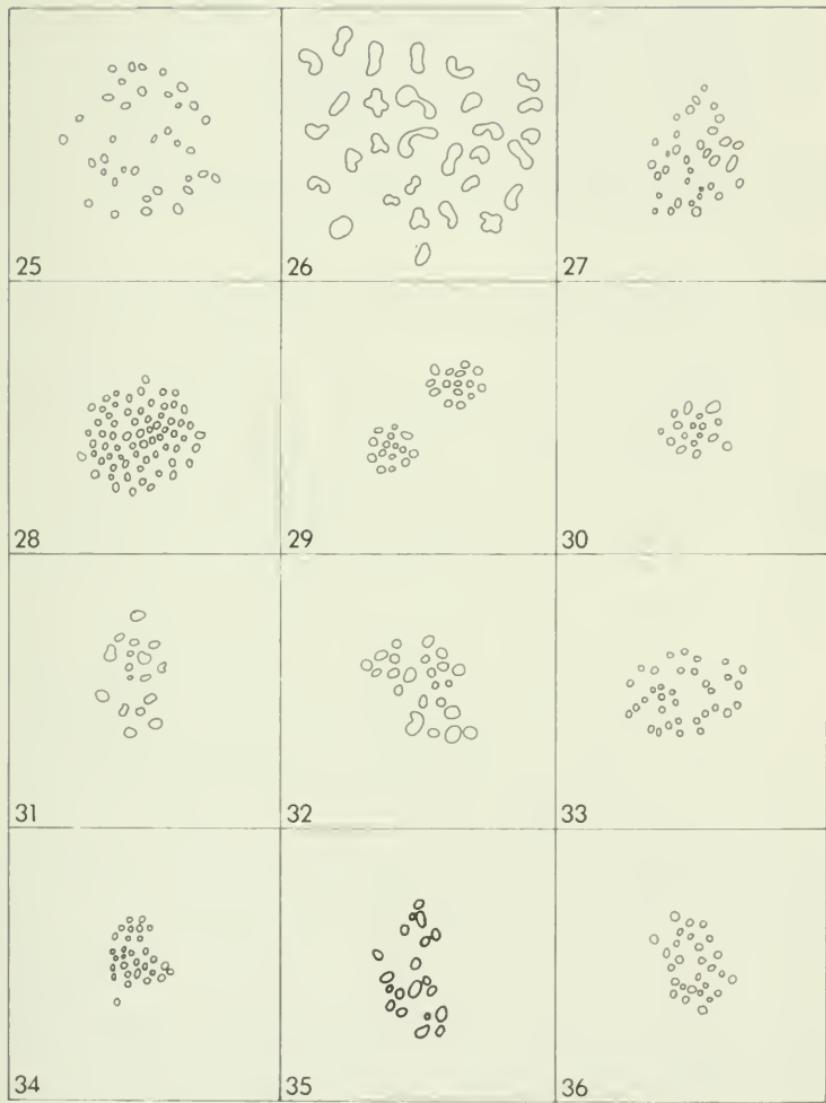
1. Meriania grandidens. n = 31.
2. Axinaea ruzteranii. n = 31.
3. Bucquetia vernicosa. n = 18.
4. Acanthella sprucei. 2n = 20.
5. Macrocentrum minus. n = 12.
6. Triolena pustulata. n = 17.
7. Trembleya parviflora subsp. triflora. 2n = 22.
8. Lavoisiera grandiflora. 2n = 24.
9. Microlicia fasciculata. 2n = 46.
10. Rhynchanthera serrulata. n = 9.
11. Siphanthera cordifolia. n = 10.
12. Centradenia inaequilateralis. n = 18.
13. Marcketia taxifolia var. glandulosa. 2n = 24.
14. Macairea parvifolia. n = 12.
15. Ernestia maguirei. n = 11.
16. Nepsera aquatica. n = 9.
17. Acisanthera quadrata. n = 22.
18. Aciotis polystachya. n = 10.
19. Tibouchina kingii. n = 27.
20. Pterolepis pumila. n = 7.
21. Heterocentron glandulosum. n = 18.
22. Brachyotum parvifolium. 2n = 20.
23. Chaetolepis microphylla. n = 9.
24. Schwackaea cupheoides. n = 18.
25. Monochaetum humboldti-anum var. hirtum. 2n = 36.
26. Arthrostema ciliatum. n = 30.
27. Conostegia montana. 2n = 34.
28. Miconia dodecandra. n = 68.
29. Heterotrichum umbellatum. n = 15.
30. Tetrazygia bicolor. n = 17.
31. Clidemia insularis. n = 17.
32. Clidemia ruddae. n = 23.
33. Maieta guianensis. 2n = 34.
34. Myriaspura egensis. 2n = 30.
35. Bellucia axinanthera. n = 20.
36. Henriettea ramiflora. n = 28.
37. Leandra solenifera. n = 17.
38. Ossaea hirsuta. n = 17.
39. Blakea trinervia. n = 31.
40. Topobea superba. 2n = 56.



10 microns



10 microns



10 microns

